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# LCD TV

# SERVICE MANUAL

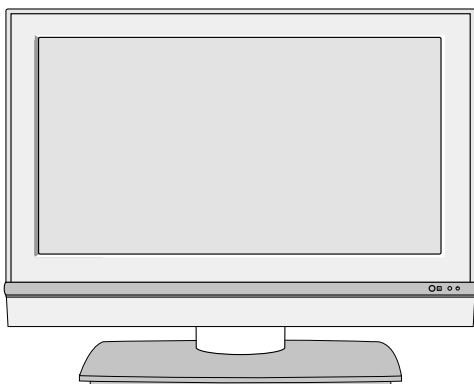
**CHASSIS : LA51D**

**FACTORY NAME : 32LC2DC**

**MODEL : 32LC2DC**

## **CAUTION**

BEFORE SERVICING THE CHASSIS,  
READ THE SAFETY PRECAUTIONS IN THIS MANUAL.



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# SAFETY PRECAUTIONS

## IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by  $\triangle$  in the Schematic Diagram and Replacement Parts List.

It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent Shock, Fire, or other Hazards.

Do not modify the original design without permission of manufacturer.

### General Guidance

An **isolation Transformer should always be used** during the servicing of a receiver whose chassis is not isolated from the AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks.

It will also protect the receiver and its components from being damaged by accidental shorts of the circuitry that may be inadvertently introduced during the service operation.

If any fuse (or Fusible Resistor) in this TV receiver is blown, replace it with the specified.

When replacing a high wattage resistor (Oxide Metal Film Resistor, over 1W), keep the resistor 10mm away from PCB.

Keep wires away from high voltage or high temperature parts.

### Before returning the receiver to the customer,

always perform an **AC leakage current check** on the exposed metallic parts of the cabinet, such as antennas, terminals, etc., to be sure the set is safe to operate without damage of electrical shock.

### Leakage Current Cold Check(Antenna Cold Check)

With the instrument AC plug removed from AC source, connect an electrical jumper across the two AC plug prongs. Place the AC switch in the on position, connect one lead of ohm-meter to the AC plug prongs tied together and touch other ohm-meter lead in turn to each exposed metallic parts such as antenna terminals, phone jacks, etc.

If the exposed metallic part has a return path to the chassis, the measured resistance should be between  $1M\Omega$  and  $5.2M\Omega$ .

When the exposed metal has no return path to the chassis the reading must be infinite.

An other abnormality exists that must be corrected before the receiver is returned to the customer.

### Leakage Current Hot Check (See below Figure)

Plug the AC cord directly into the AC outlet.

### Do not use a line Isolation Transformer during this check.

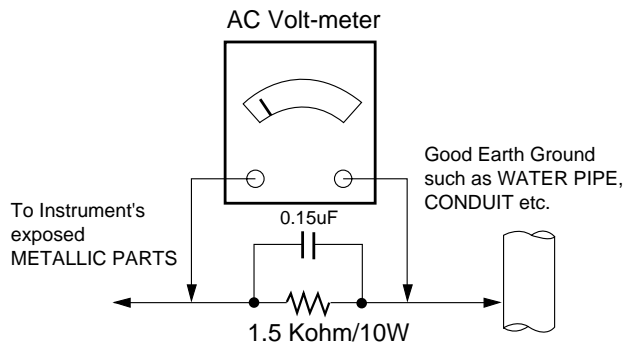
Connect 1.5K/10watt resistor in parallel with a 0.15uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.

Measure the AC voltage across the resistor using AC voltmeter with 1000 ohms/volt or more sensitivity.

Reverse plug the AC cord into the AC outlet and repeat AC voltage measurements for each exposed metallic part. Any voltage measured must not exceed 0.75 volt RMS which corresponds to 0.5mA.

In case any measurement is out of the limits specified, there is possibility of shock hazard and the set must be checked and repaired before it is returned to the customer.

### Leakage Current Hot Check circuit



# SERVICING PRECAUTIONS

**CAUTION:** Before servicing receivers covered by this service manual and its supplements and addenda, read and follow the **SAFETY PRECAUTIONS** on page 3 of this publication.

**NOTE:** If unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions on page 3 of this publication, always follow the safety precautions. Remember: Safety First.

## General Servicing Precautions

1. Always unplug the receiver AC power cord from the AC power source before;
  - a. Removing or reinstalling any component, circuit board module or any other receiver assembly.
  - b. Disconnecting or reconnecting any receiver electrical plug or other electrical connection.
  - c. Connecting a test substitute in parallel with an electrolytic capacitor in the receiver.

**CAUTION:** A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.

2. Test high voltage only by measuring it with an appropriate high voltage meter or other voltage measuring device (DVM, FETVOM, etc) equipped with a suitable high voltage probe. Do not test high voltage by "drawing an arc".

3. Do not spray chemicals on or near this receiver or any of its assemblies.

4. Unless specified otherwise in this service manual, clean electrical contacts only by applying the following mixture to the contacts with a pipe cleaner, cotton-tipped stick or comparable non-abrasive applicator; 10% (by volume) Acetone and 90% (by volume) isopropyl alcohol (90%-99% strength)

**CAUTION:** This is a flammable mixture.

Unless specified otherwise in this service manual, lubrication of contacts is not required.

5. Do not defeat any plug/socket B+ voltage interlocks with which receivers covered by this service manual might be equipped.
6. Do not apply AC power to this instrument and/or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.
7. Always connect the test receiver ground lead to the receiver chassis ground before connecting the test receiver positive lead.

Always remove the test receiver ground lead last.

8. Use with this receiver only the test fixtures specified in this service manual.

**CAUTION:** Do not connect the test fixture ground strap to any heat sink in this receiver.

## Electrostatically Sensitive (ES) Devices

Some semiconductor (solid-state) devices can be damaged easily by static electricity. Such components commonly are called *Electrostatically Sensitive (ES) Devices*. Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed to prevent potential shock reasons prior to applying power to the

unit under test.

2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static type solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.

**CAUTION:** Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.
8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device.)

## General Soldering Guidelines

1. Use a grounded-tip, low-wattage soldering iron and appropriate tip size and shape that will maintain tip temperature within the range or 500° F to 600° F.
2. Use an appropriate gauge of RMA resin-core solder composed of 60 parts tin/40 parts lead.
3. Keep the soldering iron tip clean and well tinned.
4. Thoroughly clean the surfaces to be soldered. Use a mall wire-bristle (0.5 inch, or 1.25cm) brush with a metal handle. Do not use freon-propelled spray-on cleaners.
5. Use the following unsoldering technique
  - a. Allow the soldering iron tip to reach normal temperature. (500° F to 600° F)
  - b. Heat the component lead until the solder melts.
  - c. Quickly draw the melted solder with an anti-static, suction-type solder removal device or with solder braid.

**CAUTION:** Work quickly to avoid overheating the circuitboard printed foil.
6. Use the following soldering technique.
  - a. Allow the soldering iron tip to reach a normal temperature (500° F to 600° F)
  - b. First, hold the soldering iron tip and solder the strand against the component lead until the solder melts.
  - c. Quickly move the soldering iron tip to the junction of the component lead and the printed circuit foil, and hold it there only until the solder flows onto and around both the component lead and the foil.

**CAUTION:** Work quickly to avoid overheating the circuit board printed foil.
  - d. Closely inspect the solder area and remove any excess or splashed solder with a small wire-bristle brush.

## IC Remove/Replacement

Some chassis circuit boards have slotted holes (oblong) through which the IC leads are inserted and then bent flat against the circuit foil. When holes are the slotted type, the following technique should be used to remove and replace the IC. When working with boards using the familiar round hole, use the standard technique as outlined in paragraphs 5 and 6 above.

### Removal

1. Desolder and straighten each IC lead in one operation by gently prying up on the lead with the soldering iron tip as the solder melts.
2. Draw away the melted solder with an anti-static suction-type solder removal device (or with solder braid) before removing the IC.

### Replacement

1. Carefully insert the replacement IC in the circuit board.
2. Carefully bend each IC lead against the circuit foil pad and solder it.
3. Clean the soldered areas with a small wire-bristle brush. (It is not necessary to reapply acrylic coating to the areas).

## "Small-Signal" Discrete Transistor

### Removal/Replacement

1. Remove the defective transistor by clipping its leads as close as possible to the component body.
2. Bend into a "U" shape the end of each of three leads remaining on the circuit board.
3. Bend into a "U" shape the replacement transistor leads.
4. Connect the replacement transistor leads to the corresponding leads extending from the circuit board and crimp the "U" with long nose pliers to insure metal to metal contact then solder each connection.

## Power Output, Transistor Device

### Removal/Replacement

1. Heat and remove all solder from around the transistor leads.
2. Remove the heat sink mounting screw (if so equipped).
3. Carefully remove the transistor from the heat sink of the circuit board.
4. Insert new transistor in the circuit board.
5. Solder each transistor lead, and clip off excess lead.
6. Replace heat sink.

## Diode Removal/Replacement

1. Remove defective diode by clipping its leads as close as possible to diode body.
2. Bend the two remaining leads perpendicular y to the circuit board.
3. Observing diode polarity, wrap each lead of the new diode around the corresponding lead on the circuit board.
4. Securely crimp each connection and solder it.
5. Inspect (on the circuit board copper side) the solder joints of the two "original" leads. If they are not shiny, reheat them and if necessary, apply additional solder.

## Fuse and Conventional Resistor

### Removal/Replacement

1. Clip each fuse or resistor lead at top of the circuit board hollow stake.
2. Securely crimp the leads of replacement component around notch at stake top.
3. Solder the connections.

**CAUTION:** Maintain original spacing between the replaced component and adjacent components and the circuit board to prevent excessive component temperatures.

## Circuit Board Foil Repair

Excessive heat applied to the copper foil of any printed circuit board will weaken the adhesive that bonds the foil to the circuit board causing the foil to separate from or "lift-off" the board. The following guidelines and procedures should be followed whenever this condition is encountered.

### At IC Connections

To repair a defective copper pattern at IC connections use the following procedure to install a jumper wire on the copper pattern side of the circuit board. (Use this technique only on IC connections).

1. Carefully remove the damaged copper pattern with a sharp knife. (Remove only as much copper as absolutely necessary).
2. Carefully scratch away the solder resist and acrylic coating (if used) from the end of the remaining copper pattern.
3. Bend a small "U" in one end of a small gauge jumper wire and carefully crimp it around the IC pin. Solder the IC connection.
4. Route the jumper wire along the path of the out-away copper pattern and let it overlap the previously scraped end of the good copper pattern. Solder the overlapped area and clip off any excess jumper wire.

### At Other Connections

Use the following technique to repair the defective copper pattern at connections other than IC Pins. This technique involves the installation of a jumper wire on the component side of the circuit board.

1. Remove the defective copper pattern with a sharp knife. Remove at least 1/4 inch of copper, to ensure that a hazardous condition will not exist if the jumper wire opens.
2. Trace along the copper pattern from both sides of the pattern break and locate the nearest component that is directly connected to the affected copper pattern.
3. Connect insulated 20-gauge jumper wire from the lead of the nearest component on one side of the pattern break to the lead of the nearest component on the other side. Carefully crimp and solder the connections.

**CAUTION:** Be sure the insulated jumper wire is dressed so the it does not touch components or sharp edges.

# SPECIFICATION

NOTE : Specifications and others are subject to change without notice for improvement.

## 1. Application range

- 1.1 This spec sheet is applied all of the 32 LCD TV with LA51D chassis.
- 1.2 Not included spec and each product spec in this spec sheet apply correspondingly to the following each country standard and requirement of Buyer

## 3. Test method

- 3.1 Performance : LGE TV test method followed
- 3.2 Demanded other specification
  - Safety : UL, CSA, IEC specification
  - EMC : FCC, ICES, IEC specification

## 2. Specification

Each part is tested as below without special appointment.

- 2.1 Temperature :  $20\pm 5^{\circ}\text{C}$
- 2.2 Relative Humidity :  $65\pm 10\%$
- 2.3 Power Voltage : Standard input voltage  
(110~240V@50/60Hz)

\* Standard Voltage of each product is marked by models

- 2.4 Specification and performance of each parts are followed each drawing and specification by part number in accordance with BOM.

- 2.5 The receiver must be operated for about 20 minutes prior to the adjustment.

## 4.General Specification(TV)

No	Item	Specification	Remark
1.	Receiving System	ATSC/64 & 256 QAM/ NTSC-M	
2.	Available Channel	1) VHF : 02~13 2) UHF : 14~69 3) DTV : 02-69 4) CATV : 01~135 5) CADTV : 01~135	
3.	Input Voltage	1) AC 100 ~ 240V 50/60Hz	DU-37LZ55 : 120V, 60Hz
4.	Market	NORTH AMERICA	
5.	Screen Size	32 inch Wide	For 32LC2DC
6.	Aspect Ratio	16:9	
7.	Tuning System	FS	
8.	LCD Module	LC320W01-SL11	For 32LC2DC
9.	Operating Environment	1) Temp : 0 ~ 40 deg	
		2) Humidity : ~ 80 %	
10.	Storage Environment	1)Temp : -20 ~ 60 deg	
		2) Humidity : 0 ~ 90 %	

## 5. Chroma & Brightness

5.1 CONDITION : EZ-Picture "Normal"

No	Item			Min	Typ	Max	Unit	Remark
1.	White peak brightness			400	500		cd/m²	HDMI input, full white
2.	Contrast Ratio			600:1	800:1			
3.	Brightness uniformity					1.3		Refer to LCD SPEC.
4.	Color coordinate	RED	X		0.640			+/- 0.03
			Y		0.341			+/- 0.03
		GREEN	X		0.287			+/- 0.03
			Y		0.610			+/- 0.03
		BLUE	X		0.146			+/- 0.03
			Y		0.069			+/- 0.03
		WHITE	X		0.285			+/- 0.03
			Y		0.293			+/- 0.03
5.	Viewing angle				176			R/L, U/D
6.	Color Temperature	Standard		8,300	9,300	10,300		<Test Signal>
		Cool		11,000	12,000	13,000		HDMI input, With 16-gray
		Warm		5,500	6,500	7,500		pattern, 6th bar from right
7.	Color Distortion, DG						%	
8.	Color Distortion, DP						deg	
9.	Color S/N, AM/FM						dB	

## 6. Component Video Input (Y, CB/PB, CR/PR)

No	Specification				Proposed
	Resolution	H-freq(kHz)	V-freq(Hz)	Pixel clock	
1.	720*480	15.73	60		SDTV ,DVD 480I
2.	720*480	15.73	59.94		SDTV ,DVD 480I
3.	720*480	31.50	60		SDTV 480P
4.	720*480	31.47	59.94		SDTV 480P
5.	1280*720	45.00	60.00		HDTV 720P
6.	1280*720	44.96	59.94		HDTV 720P
7.	1920*1080	33.75	60.00		HDTV 1080I
8.	1920*1080	33.72	59.94		HDTV 1080I

## 7. RGB Input (PC/DTV)

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	
	PC					
1	720*400	31.469	70.08	28.32	DOS	O
2	640*480	31.469	59.94	25.17	VESA(VGA)	O
3	640*480	37.861	72.80	31.50	VESA(VGA)	O
4	640*480	37.500	75.00	31.50	VESA(VGA)	O
5	800*600	35.156	56.25	36.00	VESA(SVGA)	O
6	800*600	37.879	60.31	40.00	VESA(SVGA)	O
7	800*600	48.077	72.18	50.00	VESA(SVGA)	O
8	800*600	46.875	75.00	49.50	VESA(SVGA)	O
9	1024*768	48.363	60.00	65.00	VESA(XGA)	O
10	1024*768	56.476	70.06	75.00	VESA(XGA)	O
11	1024*768	60.023	75.02	78.75	VESA(XGA)	O
	DTV					
1.	720*480	31.47	59.94		SDTV 480P	
2.	720*480	31.50	60		SDTV 480P	
3.	1280*720	45.00	60.00		HDTV 720P	
4.	1280*720	44.96	59.94		HDTV 720P	
5.	1920*1080	33.75	60.00		HDTV 1080I	
6.	1920*1080	33.72	59.94		HDTV 1080I	



## 8. HDMI Input (PC/DTV)

No	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	
	PC					DDC
1.	640*480	31.469	59.94	25.17	VESA(VGA)	O
2.	640*480	37.861	72.80	31.50	VESA(VGA)	O
3.	640*480	37.500	75.00	31.50	VESA(VGA)	O
4.	800*600	35.156	56.25	36.00	VESA(SVGA)	O
5.	800*600	37.879	60.31	40.00	VESA(SVGA)	O
6.	800*600	48.077	72.18	50.00	VESA(SVGA)	O
7.	800*600	46.875	75.00	49.50	VESA(SVGA)	O
8.	1024*768	48.363	60.00	65.00	VESA(XGA)	O
9.	1024*768	56.476	70.06	75.00	VESA(XGA)	O
10.	1024*768	60.023	75.02	78.75		O
DTV						
11.	720*480	31.500	60	27.03	SDTV 480P	
12.	720*480	31.469	59.94	27.00	SDTV 480P	
13.	1280*720	45.00	60.00		HDTV 720P	
14.	1280*720	44.96	59.94		HDTV 720P	
15.	1920*1080	33.75	60.00		HDTV 1080I	
16.	1920*1080	33.72	59.94		HDTV 1080I	

## 9. Mechanical specification

No,	Item	Content			Remark
1	Product Dimenson		Width(W)	Length(D)	Height(H)
		Before Packing	811	235	630
		After Packing	896	300	720
2	Product Weight	Only SET	22Kg		
		With Box	25.5Kg		

# ADJUSTMENT INSTRUCTION

## 1. Application Object

These instructions are applied to all of the LCD TV, AF-05FD.

## 2. Notes

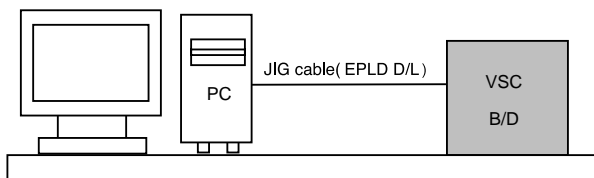
- (1) Because this is not a hot chassis, it is not necessary to use an isolation transformer. However, the use of isolation transformer will help protect test equipment.
- (2) Adjustments must be done in the correct order.
- (3) The adjustments must be performed in the conditions of  $25\pm5^{\circ}\text{C}$  of temperature and  $65\pm10\%$  of relative humidity if there is no specific designation.
- (4) The input voltage of the receiver must be kept 110V, 60Hz during adjustment.
- (5) The receiver must be operational for about 15 minutes prior to the adjustments.

- 1) After receiving 100% white pattern, the receiver must be operated 15 minutes prior to adjustment. (or 8. White Pattern condition in EZ - Adjust)
- 2) Enter into White Pattern
  - Pressing POWER ON Key on Service Remote Control (S R/C)
  - Enter the Ez - Adjust by pressing ADJ Key on Service Remote Control (S R/C).
  - Select the 8. White Pattern using CH +/- Key and press the Enter(Y) Key.
  - Display the 100% Full White Pattern.

[The set will display white screen without a signal generator in this mode.]

If you turn on a still screen more than 20 minutes (Especially Digital pattern, Cross Hatch Pattern), an afterimage may occur in the black level part of the screen.

## 3. EPLD Download



<Fig 1> Connection Diagram of EPLD Download

- (1) Test Equipment : PC, Jig for download
- (2) Connect the power of VSC B/D.
- (3) Execute download program(iMPACK) of PC.
- (4) After executing the hot key on the Programmer, click icon
- (5) End after confirming

## 4. EDID(The Extended Display Identification Data)/DDC (Display Data Channel) download

This is the function that enables "Plug and Play".

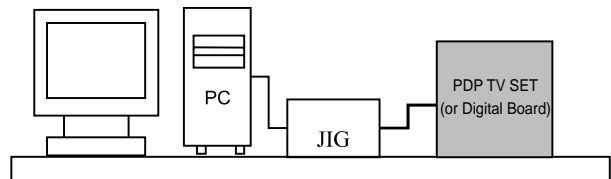
### 4-1. HDMI EDID Data Input

#### (1) Required Test Equipment

- 1) Jig for adjusting PC, DDC. (PC serial to D-sub. Connection equipment)
- 2) S/W for writing DDC(EDID data write & read)
- 3) D-Sub cable
- 4) Jig for HDMI Cable connection

#### (2) Preparation for Adjustments & Setting of Device

- 1) Set devices as below and turn on the PC and JIG.
- 2) Open S/W for writing DDC (EDID data write & read). (operated in DOS mode)



<Fig. 2>

### 4-2. EDID DATA for LA51D

EDID for HDMI 1 (DDC (Display Data Channel) Data)

EDID table =

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	01	00	01	01	01	01
10	00	0E	01	03	80	52	2E	78	0A	D4	6C	A3	57	49	9C	25
20	11	48	4B	4F	CE	00	31	4F	45	4F	61	4F	01	01	01	01
30	01	01	01	01	01	01	64	19	00	40	41	00	26	30	18	88
40	36	00	BA	88	21	00	00	18	00	00	00	FD	00	38	4B	1E
50	3D	08	00	0A	20	20	20	20	20	20	00	00	00	FC	00	33
60	32	4C	43	32	44	2D	55	44	0A	20	20	20	00	00	00	00
70	00	00	00	00	00	00	00	00	00	00	00	00	00	00	01	D3

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	02	03	13	F1	44	84	05	03	02	23	15	07	50	65	03	0C
10	00	10	00	01	1D	00	72	51	D0	1E	20	DC	28	45	04	BA
20	88	21	00	00	1E	01	1D	80	18	71	1C	16	20	94	2C	F5
30	00	BA	88	21	00	00	1E	8C	0A	D0	8A	20	E0	2D	10	3C
40	3E	E6	04	BA	88	21	00	00	18	8C	0A	D0	8A	20	E0	2D
50	10	3C	3E	E6	04	BA	88	21	00	00	18	00	00	00	00	00
60	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
70	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	8E

EDID DATA for RGB  
EDID table =

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	5D	46	01	01	01	01
10	07	0F	01	03	68	46	28	96	0A	D4	6C	A3	57	49	9C	25
20	11	48	4B	AF	CE	00	31	4F	45	4F	61	4F	01	01	01	01
30	01	01	01	01	01	01	64	19	00	40	41	00	26	30	18	88
40	36	00	BC	88	21	00	00	18	00	00	00	FD	00	38	4B	1E
50	3D	08	00	0A	20	20	20	20	20	20	00	00	00	FC	00	33
60	32	4C	43	32	44	2D	55	44	0A	20	20	20	00	00	00	00
70	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	34

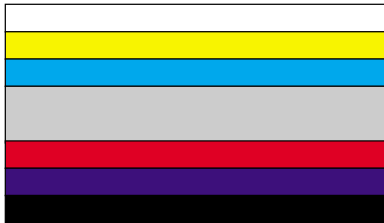
## 5. MST9883-Set Adjustment

### 5-1. Synopsis

MST9883-Set adjustment to set the black level and the Gain of optimum with an automatic movement from the analog => digital converter.

### 5-2. Test Equipment

Service R/C, MSPG925FA Pattern Generator(720P The Horizontal 100% Color Bar Pattern output will be possible and the output level will accurately have to be adjusted to 0.7±0.1Vp-p)



<Fig. 3> Adjustment Pattern : 720P/60Hz HozTV31Bar Pattern

### 5-3. Adjustment

- (1) Select Component1 or Component2 as the input with 100% Horizontal Color Bar Pattern(HozTV31Bar) in 720p Mode and select 'Normal' on screen.
- (2) After receiving signal for at least 1 second, press the ADJ Key on the Service R/C to enter the 'Ez - Adjust' and select the '2. MST9883-Set'.  
Pressing the Enter Key to adjust with automatic movement.
- (3) When the adjustment is over, 'MST9883 Component Success' is displayed. If the adjustment has errors, 'MST9883 Configuration Error' is displayed.
- (4) After the Component MST9883 adjustment is over, convert the RGB-DTV Mode and display Pattern.  
When the adjustment is over, 'MST9883 RGB\_DTV Success' is displayed. If the adjustment has errors, 'MST9883 Configuration Error' is displayed.
- (5) Readjust after confirming the case Pattern or adjustment condition where the adjustment had errors.
- (6) After adjustment is complete, exit the adjustment mode by pressing the ADJ KEY.

## 6. Adjustment of White Balance

### 6-1. Required Equipment

- (1) Color analyzer (CA-110, CA-210 or similar product)
- (2) Automatic adjustor (with automatic adjustment hour necessity and the RS-232C communication being possible)
- (3) Pattern Generator(MSPG-925FA): DVI Output

	RS-232C COMMAND			Min	CENTER(DEFAULT)			Max
	Cool	Med	Warm		Cool	Med	Warm	
R Gain	Jg	Ja	Jd	00	AE	B6	C0	ff
G Gain	Jh	Jb	Je	00	BB	B2	A5	ff
B Gain	Ji	Jc	Jf	00	C0	9A	5E	ff
R Cut					70	64	64	7f
G Cut					67	64	64	7f
B Cut					64	64	64	7f

### [ RS-232C Command (Automatic Adjustment)

### 6-2. Adjustment of White Balance

- Operate the Zero-calibration of the CA-210, then attach sensor to module surface when you adjust.
- Manual adjustment is also possible by the following sequence.

- (1) Enter 'Ez - Adjust' by pressing ADJ KEY on the Service Remote Control.
- (2) Select "8. WHITE PATTERN" using CH +/- Key and HEAT RUN at least 30 minutes by pressing the ENTER Key.
- (3) Receive the Window pattern signal from Digital Pattern Generator. (AV Input: connect the 'HDMI')
- (4) After attaching sensor to center of screen, select '5. White-Balance' of 'Ez - Adjust' by pressing the ADJ KEY on the Service R/C. Then enter adjustment mode by pressing the Right KEY (►) .

- (5) Adjust the Hight Light using R Gain/G Gain(Cool).  
Adjust the Hight Light using G Gain/B Gain(Medium).  
Adjust the Hight Light using G Gain/B Gain(Warm).

- (6) Adjust using Volume +/- KEY.  
After adjustment is complete, exit the adjustment mode by pressing the ADJ KEY.

High Level: 216gray

#### [Cool]

X; 0.274±0.002 Y; 0.275±0.002  
Color temperature: 12000°K±1000°K

#### [Medium]

X; 0.287±0.002 Y; 0.289±0.002  
Color temperature: 9300°K±1000°K

#### [Warm]

X; 0.315±0.002 Y; 0.316±0.002  
Color temperature: 6500°K±1000°K

## 7. Video(uPD)

### 7-1. Required Equipment

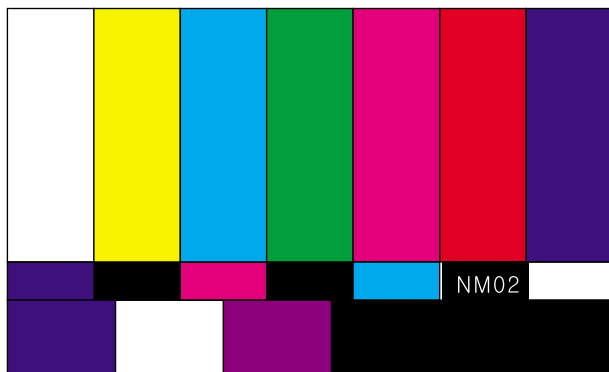
MSPG925FA Pattern Generator-connector with Video Input

### 7-2. MSG925FA Adjustment

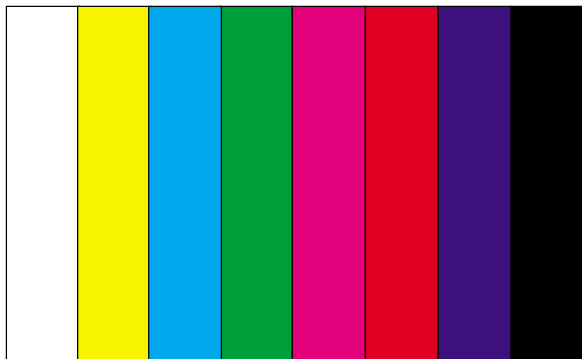
- (1) After select the model, input the #201(NTSC-M).
- (2) Receive the 100% Color Bar Pattern.(Pattern #33)
- (3) Select the Reverse button and select the signal as below figure.

### 7-3. Adjustment

- (1) After receive signal to Ant input, CVBS output of MSPG925FA to Video and confirm the signal receiving.
- (2) Enter the 'EZ-ADJUST' by pressing the ADJ Key on the Service R/C.
- (3) Select '3. Video(uPD)-Set' and enter the adjustment mode by pressing the right key(▶).
- (4) When enter the adjustment mode, displayed the TV 2CH Screen automatic at picture and appear as below figure.



- (5) When the automatic adjustment is over, 'RF Configuration Success' is displayed. If the adjustment has errors, 'Video Configuration Error' is displayed.



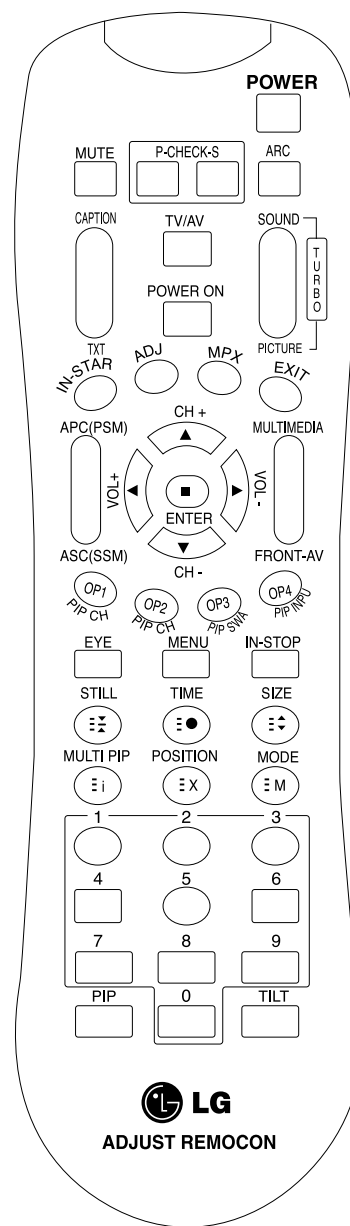
- (6) After the RF signal automatic adjustment is over, convert the Video Mode as below figure and adjust with automatic movement the Video Mode.  
When the automatic adjustment is over, 'Video Configuration Success' is displayed. If the adjustment has errors, 'Video Configuration Error' is displayed.

## 8. Shipping Conditions

No	Item		Condition	Remark
1	Input Mode		TV02CH	
2	Volume Level		30	
3	Mute		Off	
4	Aspect Ratio		16:9	
5.	Video	EZ Picture	Daylight	
		Contrast	100	
		Brightness	40	
		Color	70	
		Sharpness	70	
		Tint	0	
		Color-temperature	Cool	
6.	Audio	Audio Language	Off	
		EZ SoundRite	Off	
		EZ Sound	Normal	
		Balance	0	
		Treble	50	
		Bass	50	
		Front Surround	Off	
		TV Speaker	On	
		BBE	Off	
7.	Timer	Auto clock	On	
		Manual Clock	Off	
		Off Timer	Off	
		On Timer	Off	
		Sleep Timer	Off	
		Auto Off	Off	
8.	Option	Aspect Ratio	16:9	
		Cinema 3:2 mode	Off	
		Caption	Off	
		Caption/Text	CC1	
		Caption Option	Off	
		Language	English	
9.	Lock	Lock System	Off	
		Set password	On	(Default:0000 )
		Block channel	None	
		Movie Rating	Off	
		TV Rating-Children	None	
		TV Rating-General	None	
		Input Block	Off	
10.	Channel Memory	RF : 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 30, 51, 63		
		CATV : 15, 16, 17		

# SVC REMOCON

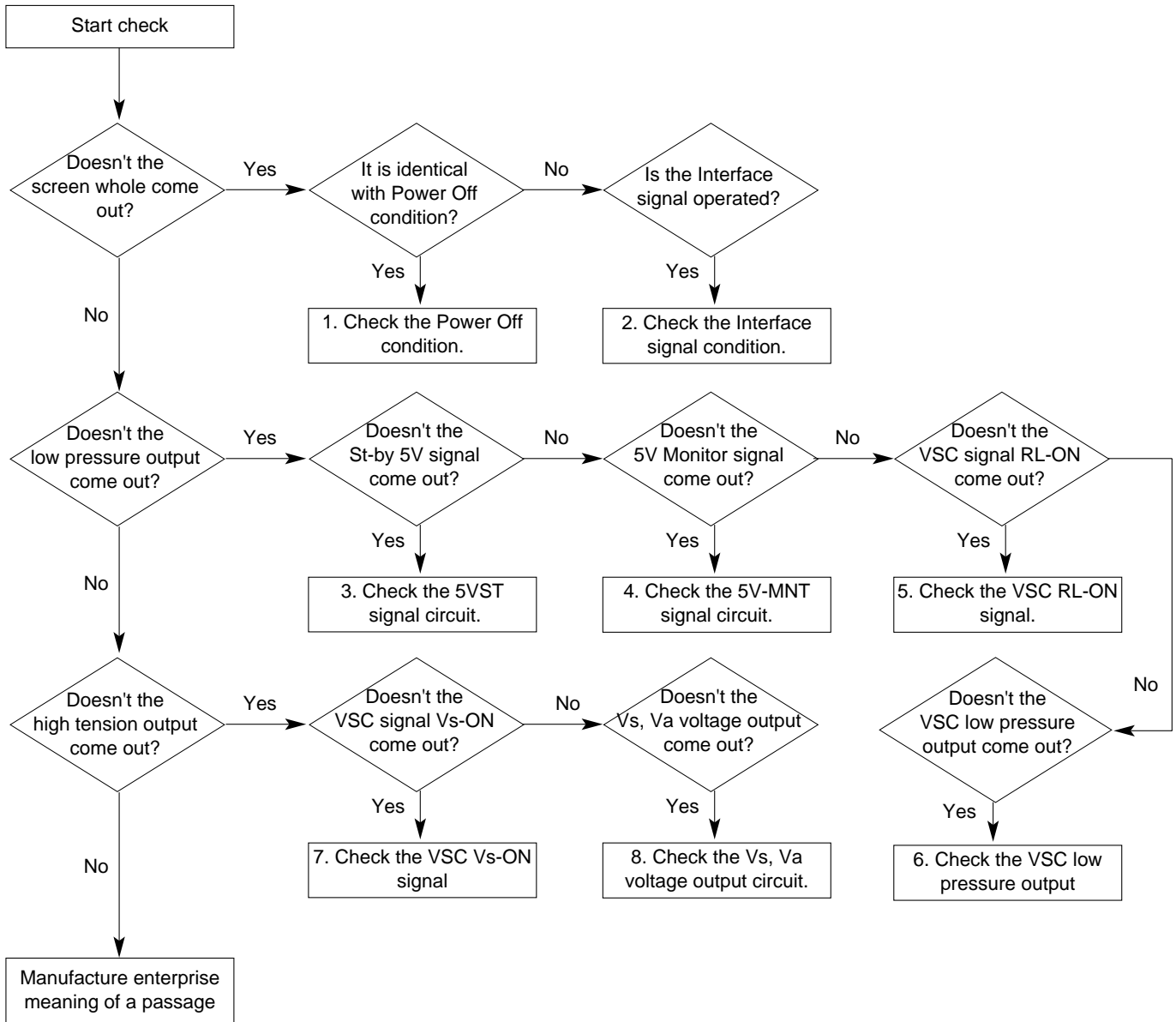
NO	KEY	FUNTION	REAMARK
1	POWER	To turn the TV on or off	
2	POWER ON	To turn the TV on automatically if the power is supplied to the TV. (Use the POWER key to deactivate): It should be deactivated when delivered.	
3	MUTE	To activate the mute function.	
4	P-CHECK	To check TV screen image easily.	Shortcut keys
5	S-CHECK	To check TV screen sound easily	Shortcut keys
6	ARC	To select size of the main screen (Normal, Spectacle, Wide or Zoom)	Shortcut keys
7	CAPTION	Switch to closed caption broadcasting	
8	TXT	To toggle on/off the teletext mode	
9	TV/AV	To select an external input for the TV screen	
10	TURBO SOUND	To start turbo sound	
11	TURBO PICTURE	To start turbo picture	
12	IN-START	To enter adjustment mode when manufacturing the TV sets.	Use the AV key to enter the screen W/B adjustment mode.
		To adjust the screen voltage (automatic): In-start → mute → Adjust → AV(Enter into W/B adjustment mode)	
		W/B adjustment (automatic): After adjusting the screen →W/B adjustment →Exit two times (Adjustment completed)	
13	ADJ	To enter into the adjustment mode. To adjust horizontal line and sub-brightness.	
14	MPX	To select the multiple sound mode (Mono, Stereo or Foreign language)	
15	EXIT	To release the adjustment mode	
16	APC(PSM)	To easily adjust the screen according to surrounding brightness	
17	ASC(SSM)	To easily adjust sound according to the program type	
18	MULTIMEDIA	To check component input	Shortcut keys
19	FRONT-AV	To check the front AV	Shortcut keys
20	CH±	To move channel up/down or to select a function displayed on the screen.	
21	VOL±	To adjust the volume or accurately control a specific function.	
22	ENTER	To set a specific function or complete setting.	
23	PIP CH-(OP1)	To move the channel down in the PIP screen. To use as a red key in the teletext mode	
24	PIP CH+(OP2)	To move the channel in the PIP screen To use as a green key in the teletext mode	
25	PIP SWAP(OP3)	To switch between the main and sub screens To use as a yellow key in the teletext mode	
26	PIP INPUT(OP4)	To select the input status in the PIP screen To use as a blue key in the teletext mode	
27	EYE	To set a function that will automatically adjust screen status to match the surrounding brightness so natural color can be displayed.	
28	MENU	To select the functions such as video, voice, function or channel.	
29	IN-STOP	To set the delivery condition status after manufacturing the TV set.	
30	STILL	To halt the main screen in the normal mode, or the sub screen at the PIP screen. Used as a hold key in the teletext mode (Page updating is stopped.)	
31	TIME	Displays the teletext time in the normal mode Enables to select the sub code in the teletext mode	
32	SIZE	Used as the size key in the PIP screen in the normal mode Used as the size key in the teletext mode	
33	MULTI PIP	Used as the index key in the teletext mode (Top index will be displayed if it is the top text.)	
34	POSITION	To select the position of the PIP screen in the normal mode Used as the update key in the teletext mode (Text will be displayed if the current page is updated.)	
35	MODE	Used as Mode in the teletext mode	
36	PIP	To select the simultaneous screen	
37	TILT	To adjust screen tilt	Shortcut keys
38	0~9	To manually select the channel.	



# TROUBLESHOOTING

## 1. Power Board

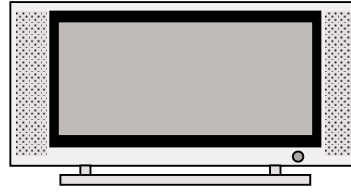
### 1-1. General Power Flow



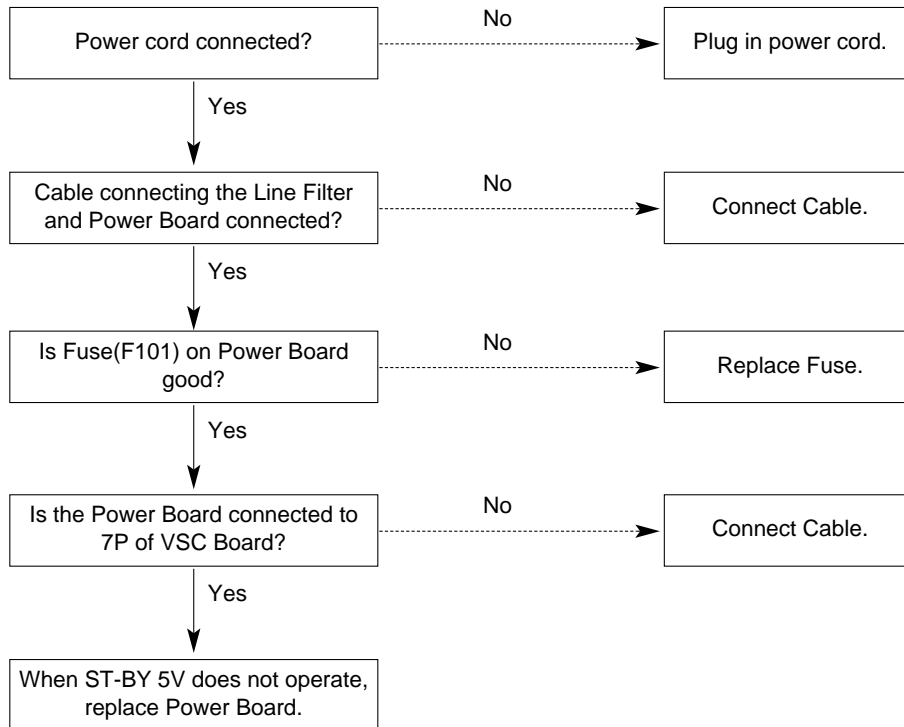
## 2. No Power

### (1) Symptom

- Does't minute discharge at module.
- No front LED.



### (2) Check follow



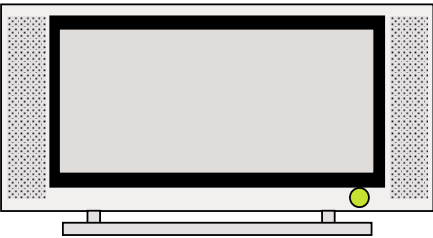


### 3. Abnormal Display

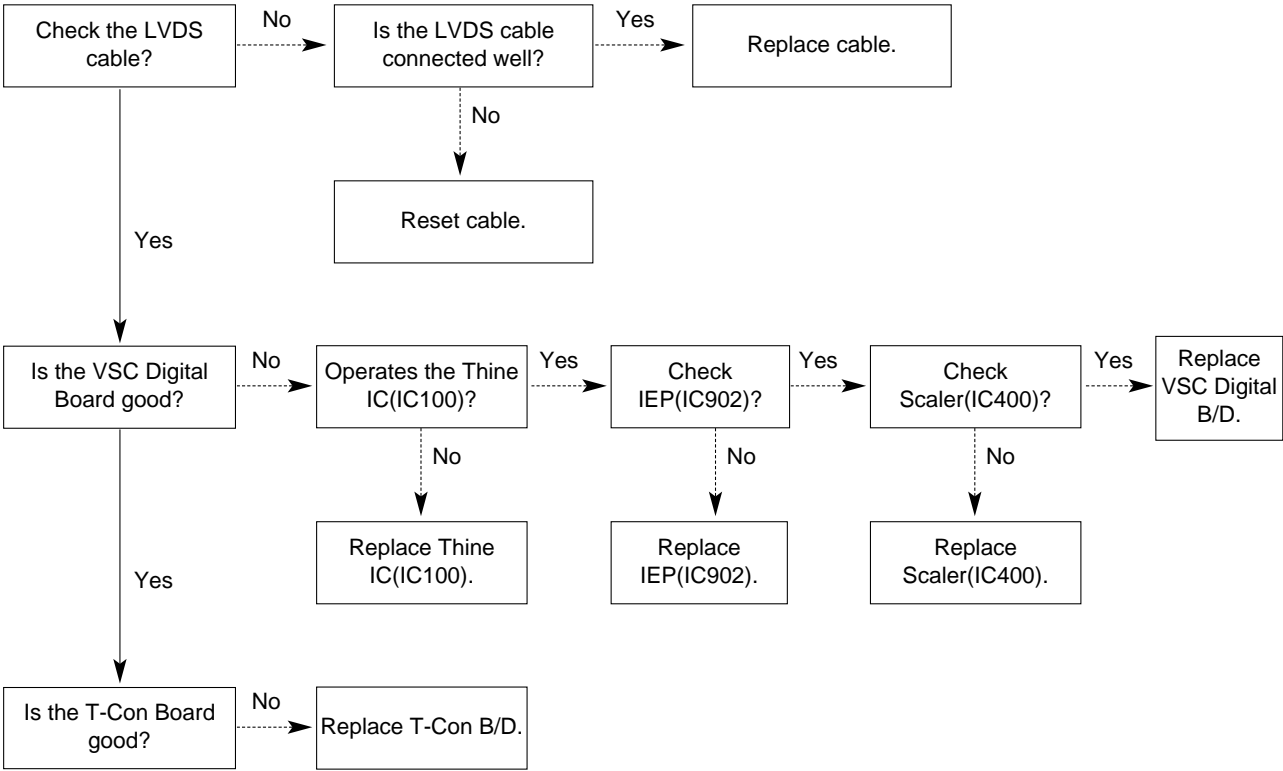
#### 3-1. Does't display the OSD

**(1) Symptom**

- LED is green
- The minute discharge continuously becomes accomplished from module



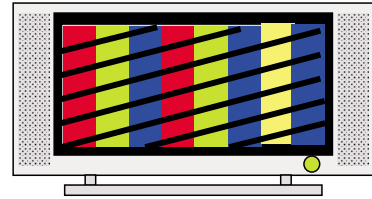
**(2) Check follow**



### 3-2. In case of does't display the screen into specific mode

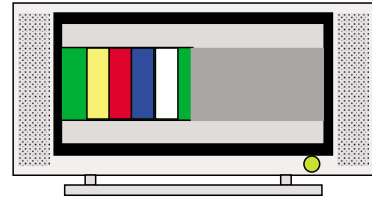
#### (1) Symptom

- The screen does not become the display from specific input mode (RF, AV, Component, RGB, DVI).

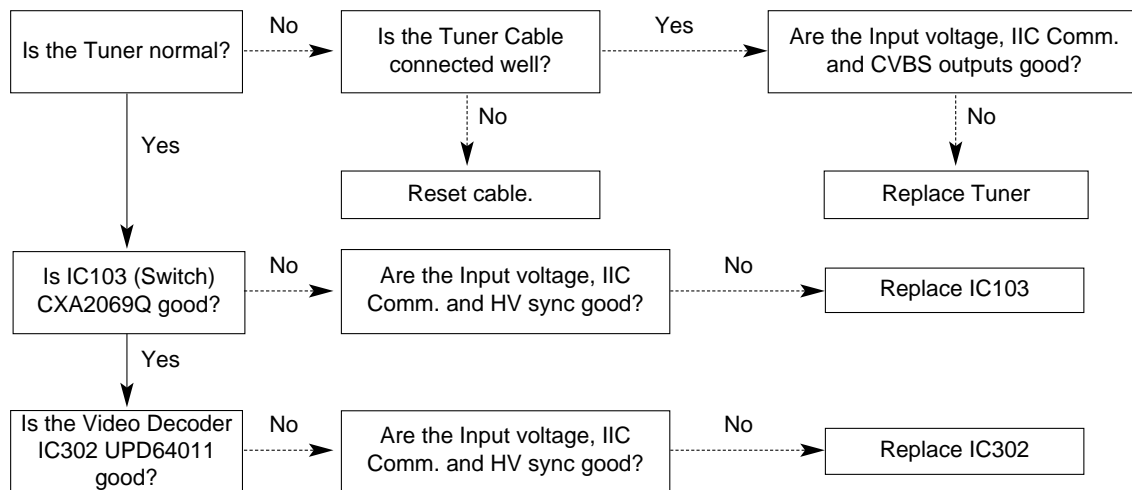


#### (2) Check follow

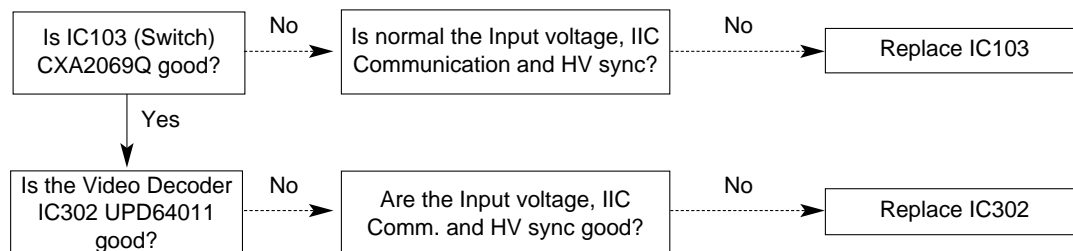
- Check the all input mode should become normality display.



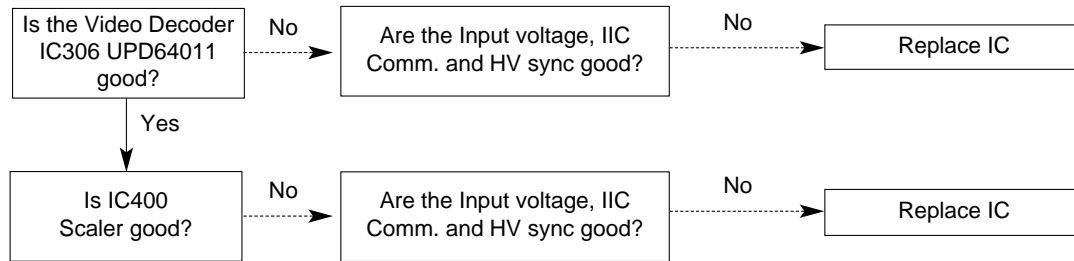
#### (3) Abnormal display in RF mode



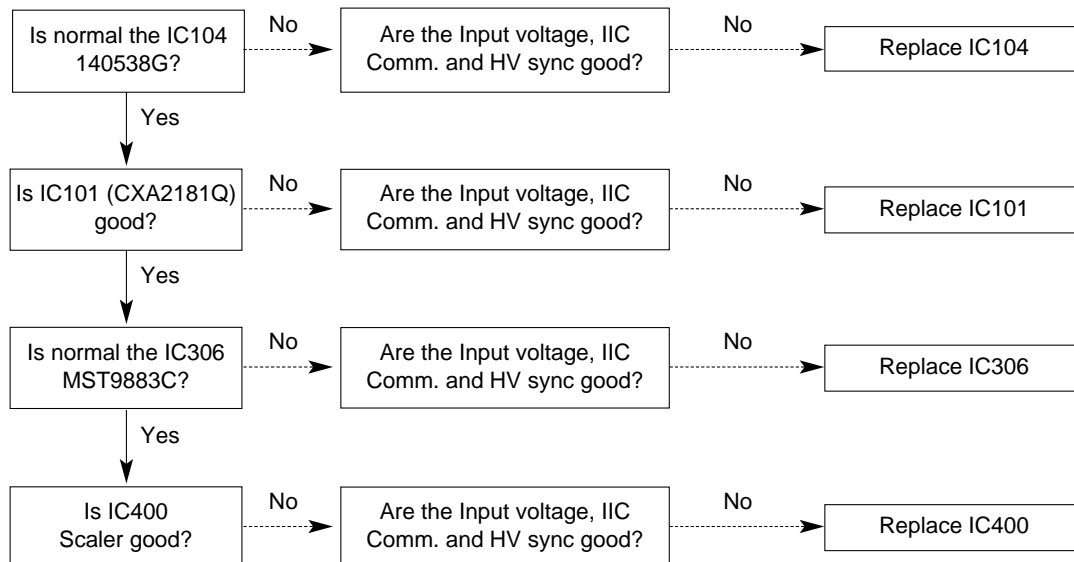
#### (4) Abnormal display in AV mode



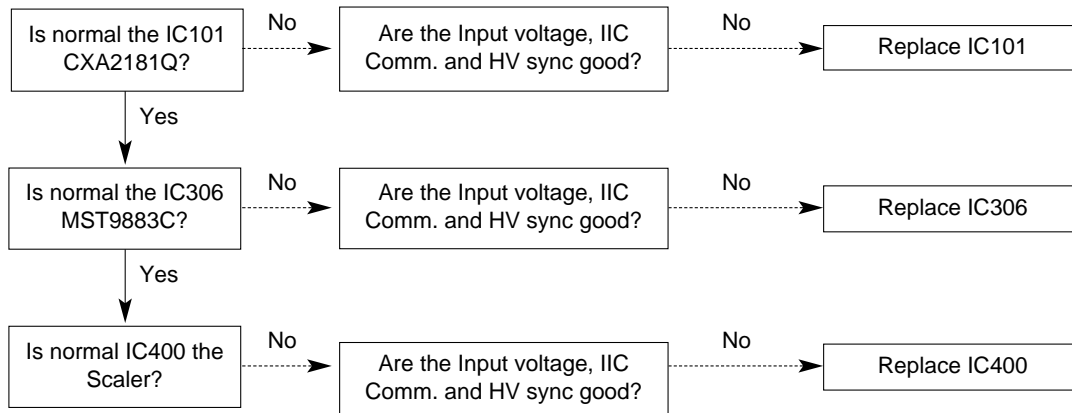
### (5) Abnormal display in Component 480i mode



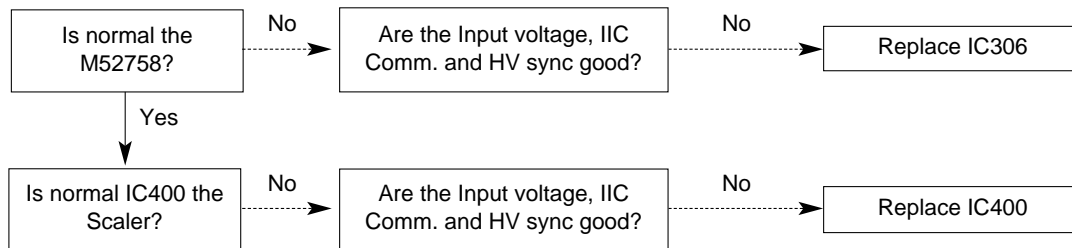
### (6) Abnormal display in Component DTV mode



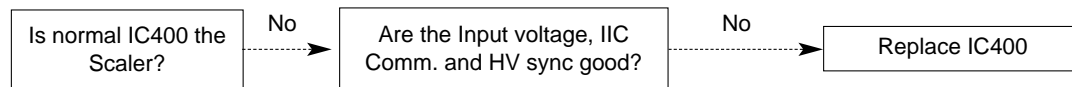
### (7) Abnormal display in RGB DTV mode



### (8) Abnormal display in RGB PC mode



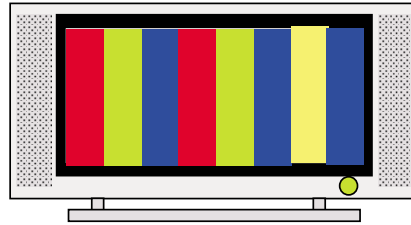
### (8) Abnormal display in DVI mode



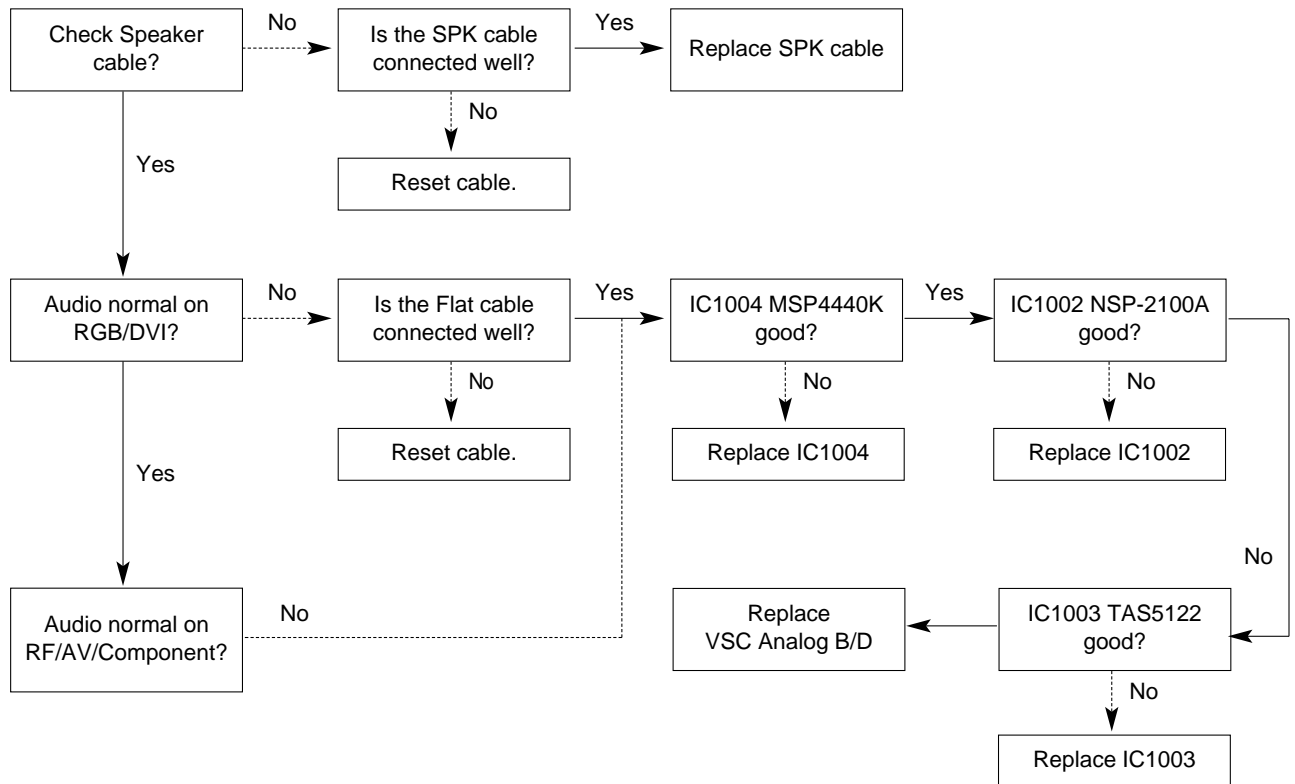
## 4. No sound

### (1) Symptom

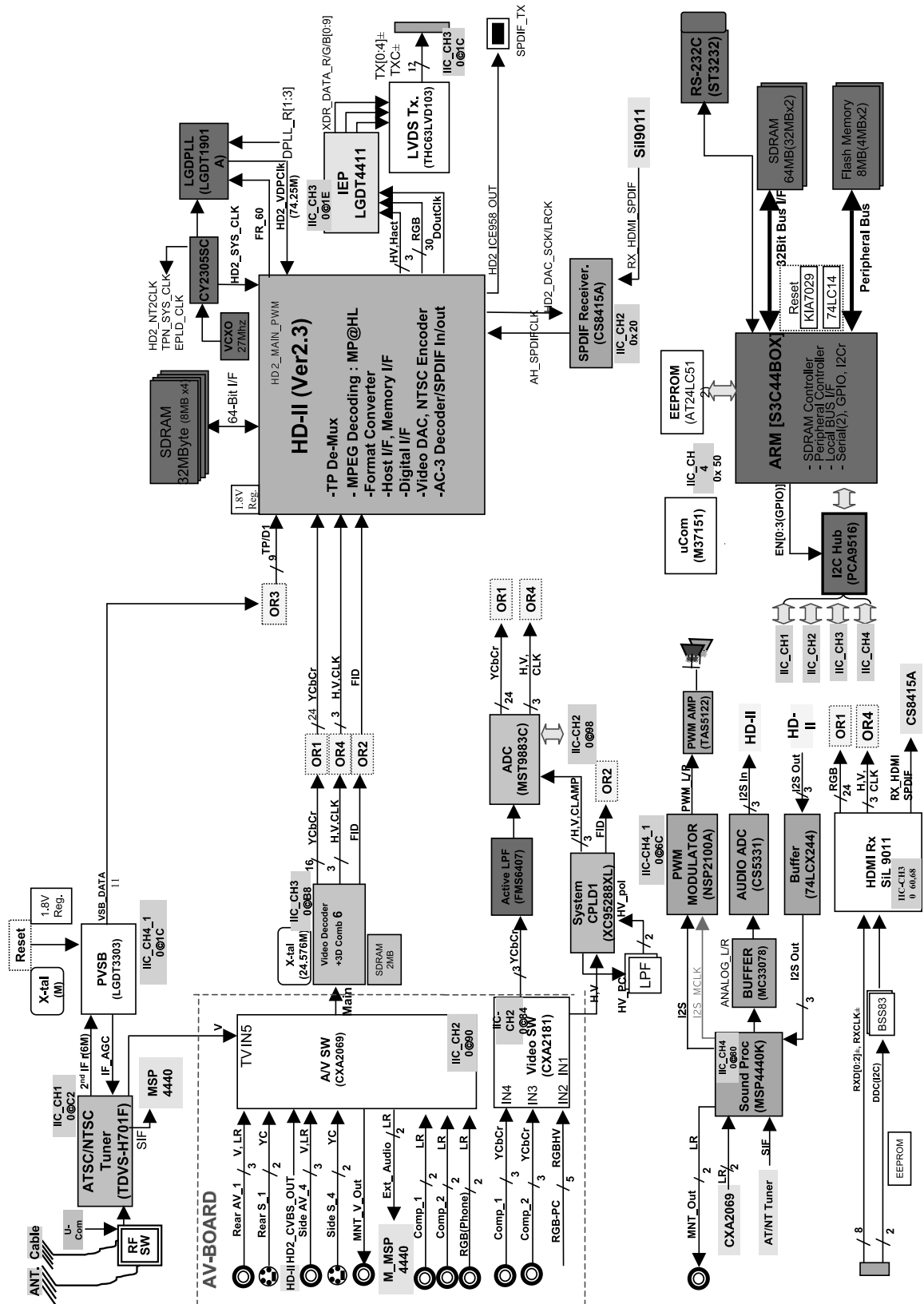
- LED is green
- Screen display but no audio



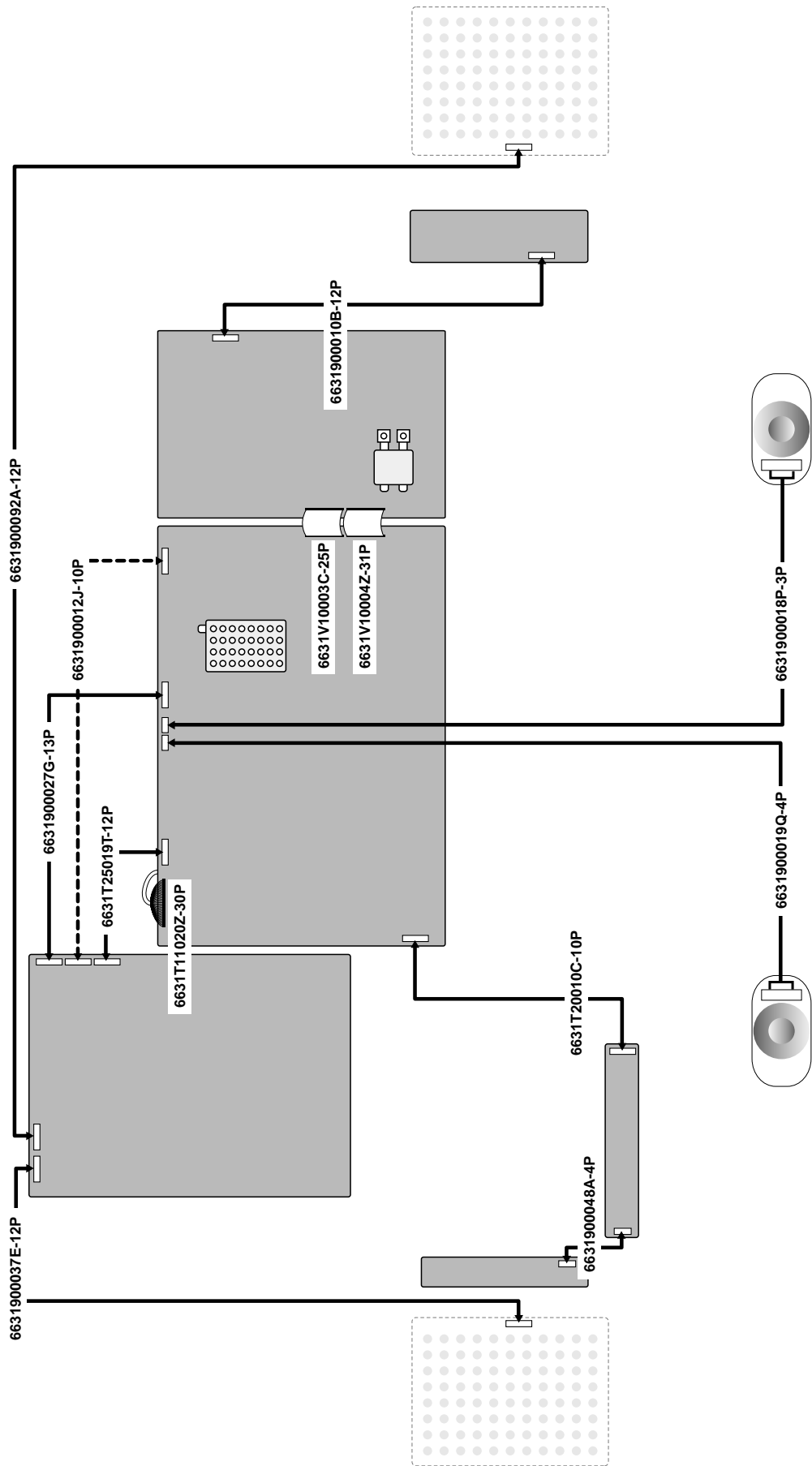
### (2) Check follow



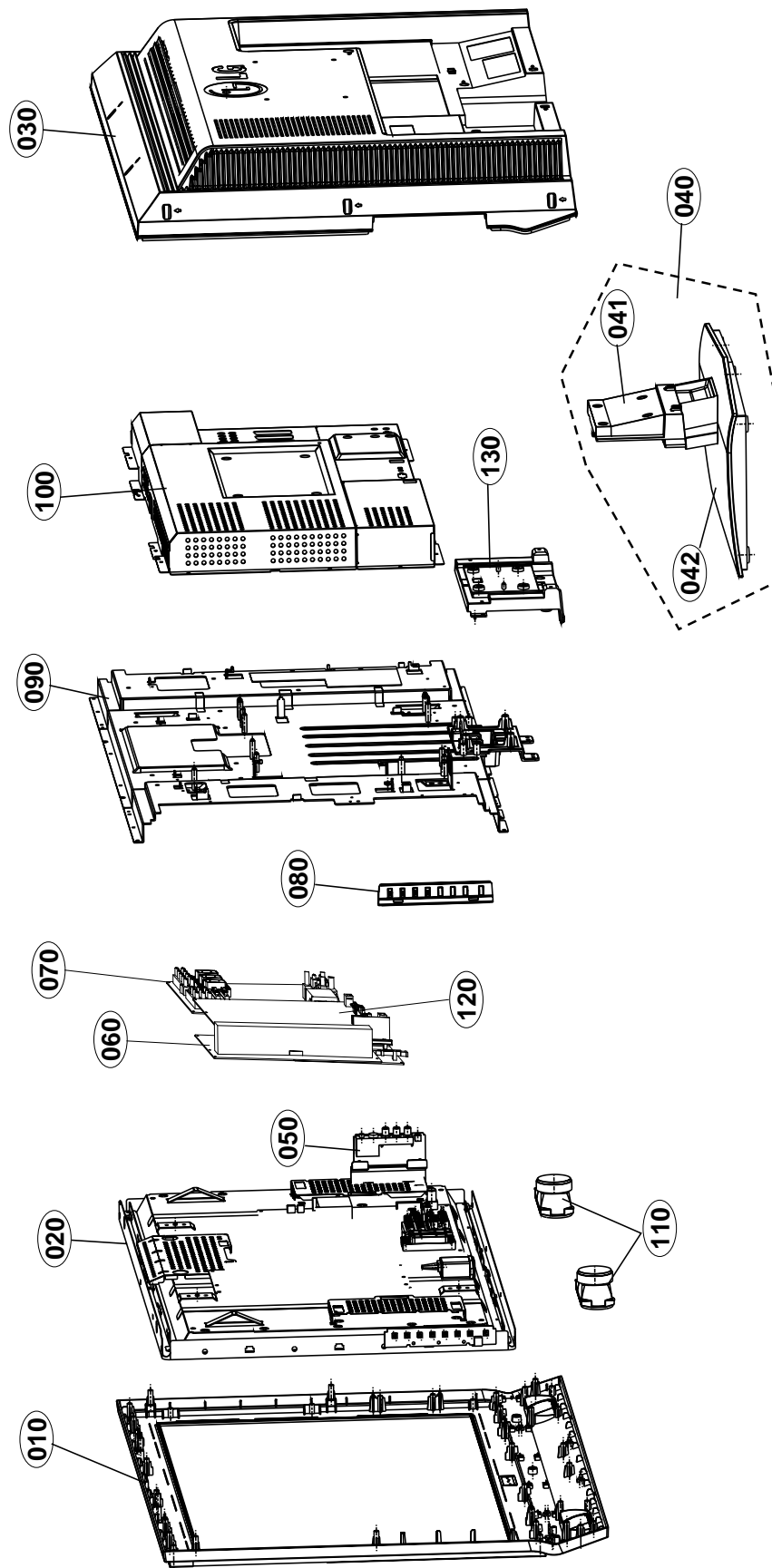
# BLOCK DIAGRAM



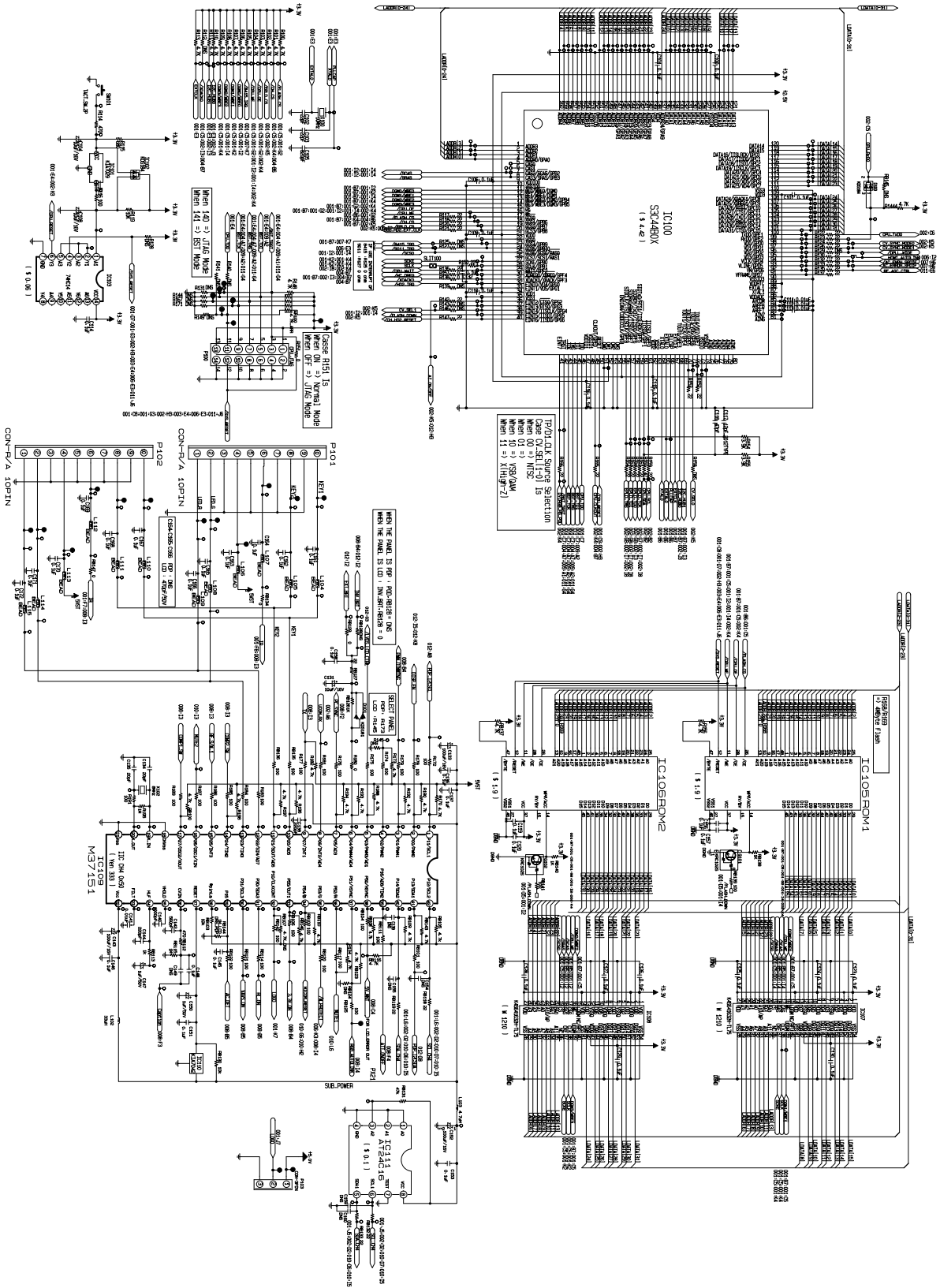
# WIRING DIAGRAM

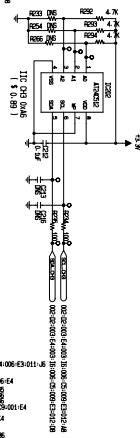


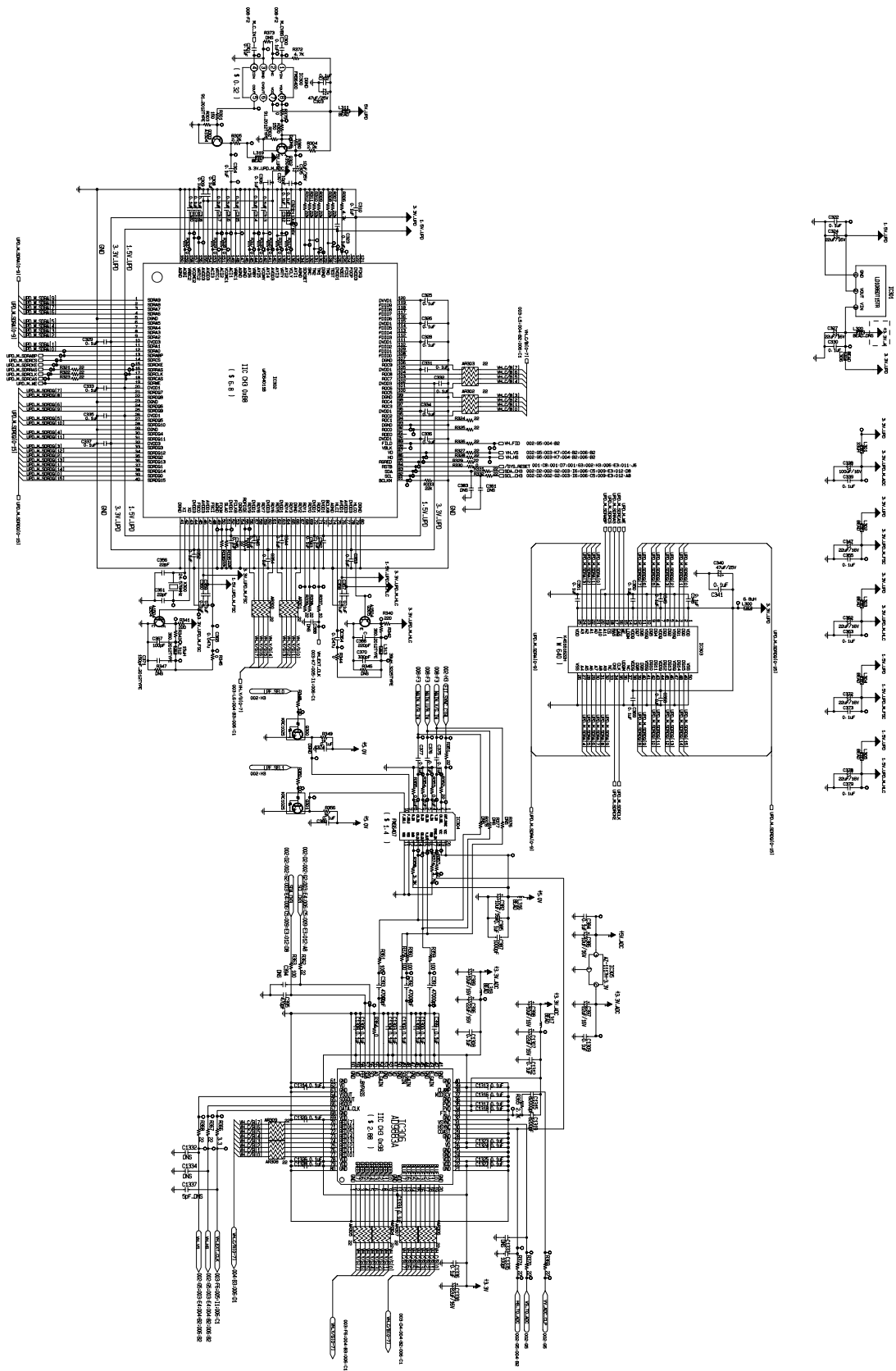
# EXPLODED VIEW













10-6 Inventory



—



OUTA Output Frequencie  
R11:61 => '110001' : 8

1

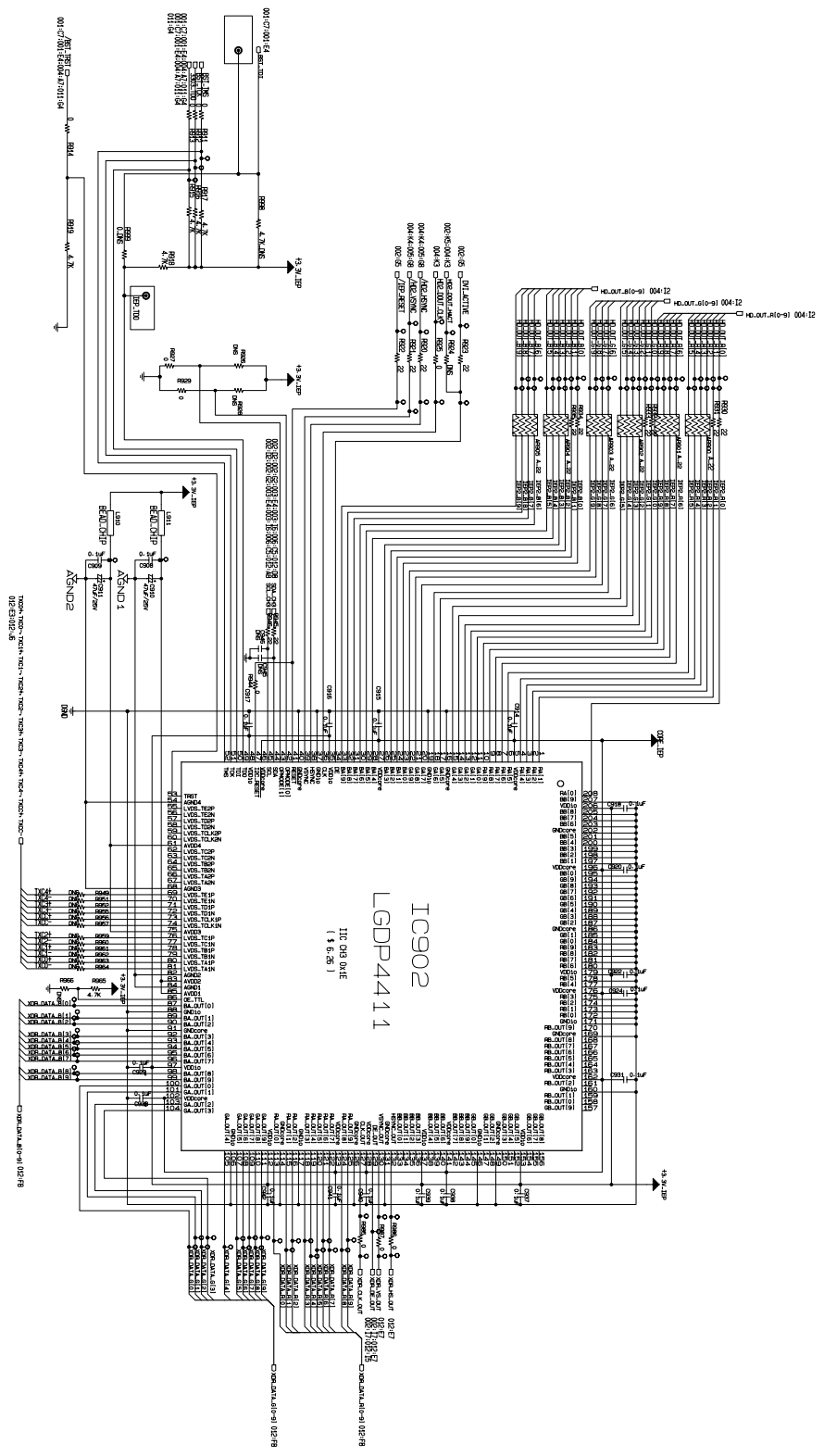
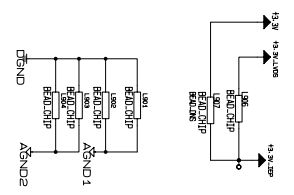
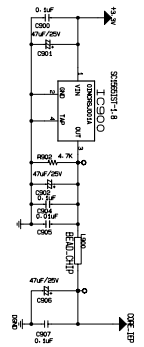


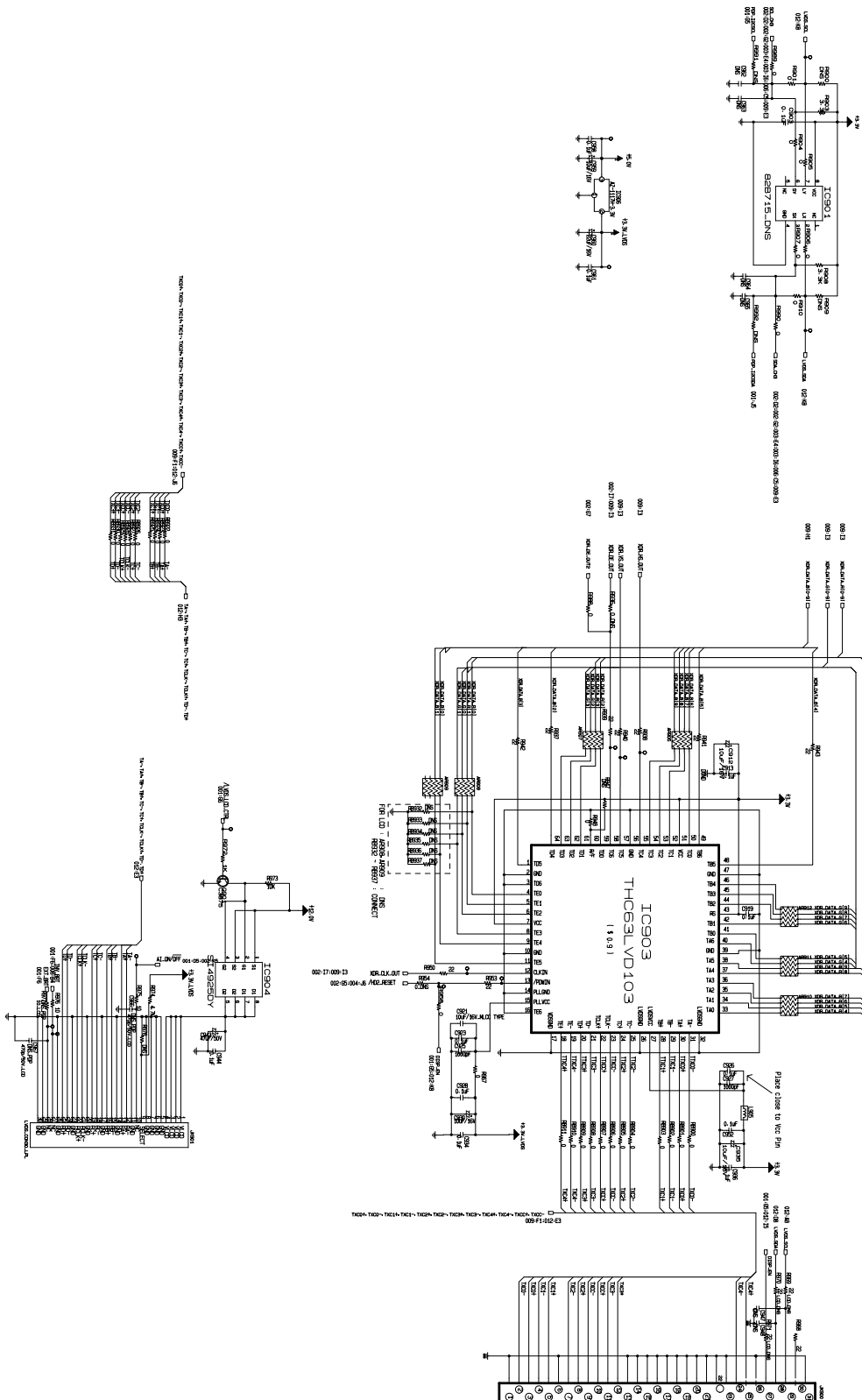




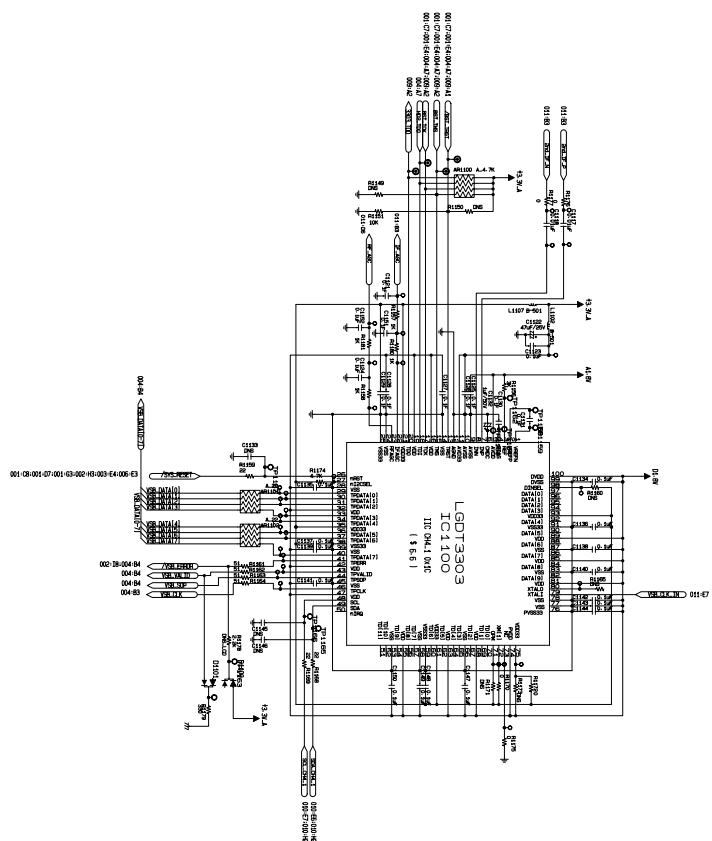
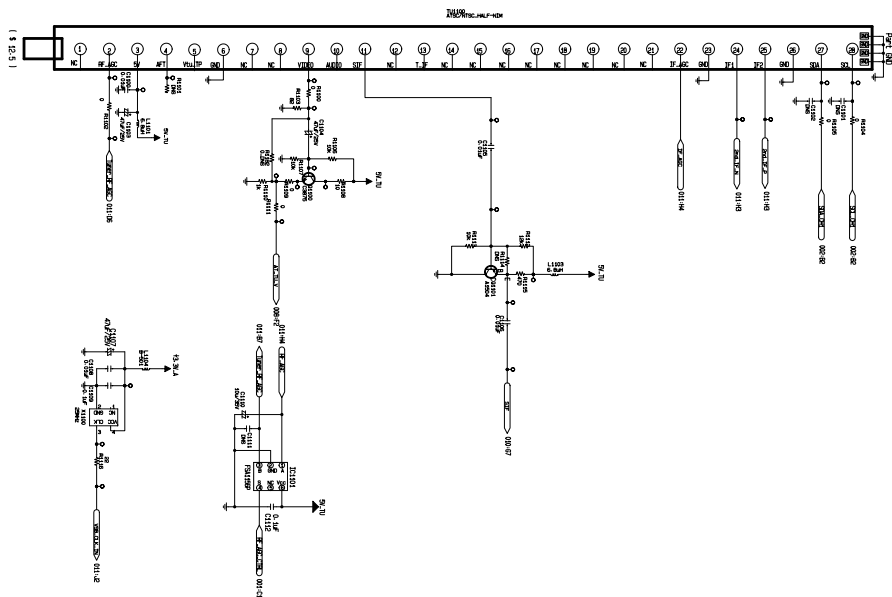




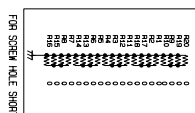
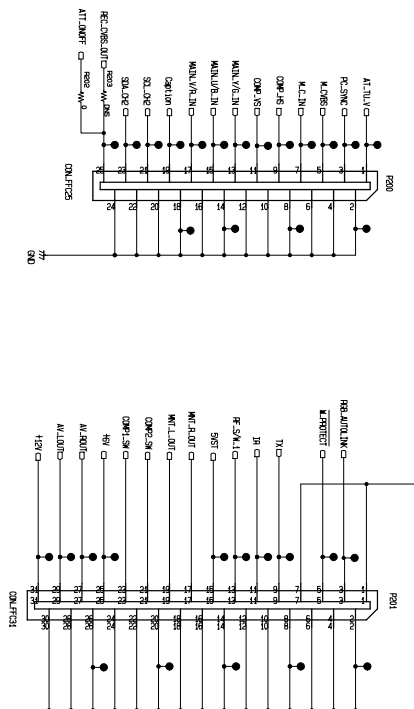
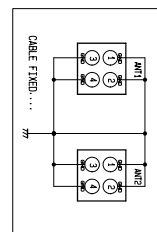
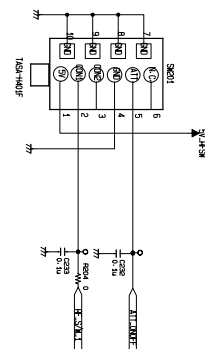


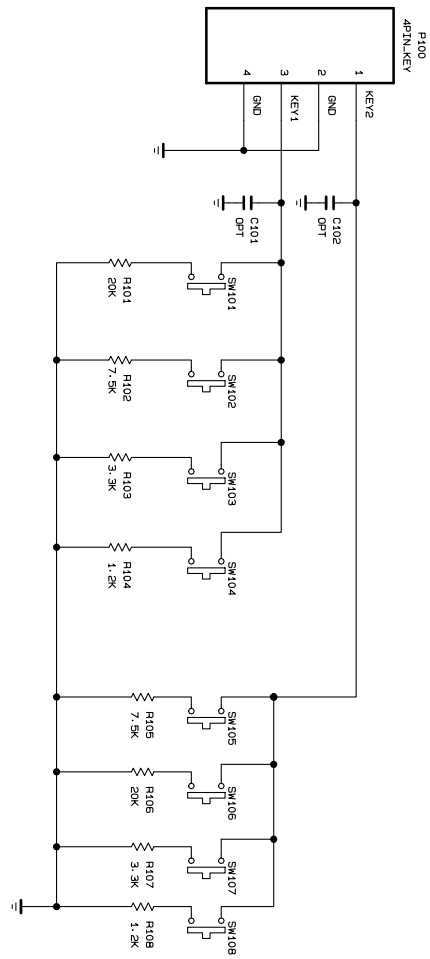












THE  SYMBOL MARK OF THIS SCHEMATIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION, FILRE AND ELECTRICAL SHOCK HAZARDS. WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFACTURES SPECIFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE  SYMBOL MARK OF THE SCHEMATIC.





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